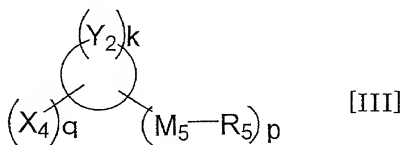


groups, at least one of which has a radical polymerizable group at its terminal,  $M_3$  and  $M_4$ , being the same or different, are divalent organic groups represented by  $-(OR)_{n2}$  (wherein R is lower alkylene which can have hydroxyl and/or oxygen, and  $n_2$  is 0 or an integer of 1 to 5) or single bonds,  $X_3$  is a substituent of the ring and is halogen, hydroxyl or lower alkyl, "l" is an  $X_3$  number of 0 to 6,  $Y_1$  is a ring member atom constituting the ring, all of the atoms  $(Y_1)_m$  are carbon atoms, or a portion of them is carbon atom(s) and the rest atoms are heteroatoms, and "m" is a member number of the ring of 5 to 8,

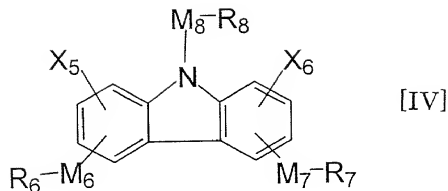
The halogenated cyclic compound is represented by the general formula [III],



wherein  $X_4$  is a substituent of the ring, at least one of plural  $(X_4)_q$  is halogen and others are hydroxyl or lower alkyl, "q" is an integer of 2 to 6,  $R_5$  is a monovalent organic group, at least one of plural  $(R_5)_p$  has a radical polymerizable group at its terminal,  $M_5$  is a divalent organic group represented by  $-(OR)_{n3}$  (wherein R is lower alkylene which can have hydroxyl and/or oxygen, and  $n_3$  is 0 or an integer of 1 to 5) or a single bond, "p" is an integer of 1 to 4,  $Y_2$  is a ring member atom constituting the ring, all of the atoms  $(Y_2)_k$  are carbon atoms, or a portion of them is carbon atom(s) and the rest atoms are heteroatoms, and "k" is a member number of the ring of 5 to 8.

The carbazole-based compound is represented by the general

formula [IV],



wherein  $R_6$ ,  $R_7$  and  $R_8$ , being the same or different, are monovalent organic groups, at least one of which has a radical polymerizable group at its terminal,  $M_6$ ,  $M_7$  and  $M_8$ , being the same or different, are divalent organic groups represented by  $\cdot(OR)_{n4}\cdot$  (wherein  $R$  is lower alkylene which can have hydroxyl and/or oxygen, and  $n4$  is 0 or an integer of 1 to 5) or single bonds, and  $X_5$  and  $X_6$ , being the same or different, are substituents of the ring and are halogen, hydroxyl or lower alkyl.

The fluorene-based compound [I] is as follows among radical polymerizable compound (b1).

In the general formula [I] of the fluorene-based compound, in the organic groups  $R_1$  and  $R_2$ , the radical polymerizable group can be a functional group such as vinyl, (meth)acryloyl or (meth)acryloyloxy. The organic groups  $R_1$  and  $R_2$  having no radical polymerizable group can be lower alkyl having one to five carbon atoms.

In  $\cdot(OR)_{n1}\cdot$  of  $M_1$  and  $M_2$ , a carbon number of the lower alkylene  $R$  is preferably one to five, more preferably one to three. Examples of  $OR$  are oxymethylene, oxyethylene, oxypropylene, oxybutylene and the like. Examples of  $(OR)_{n1}$  ( $n1$  is an integer of 2 to 5) are dioxymethylene,

dioxyethylene, dioxypropylene, dioxybutylene, trioxymethylene, trioxyethylene, trioxypropylene, trioxybutylene, tetraoxymethylene, tetraoxyethylene, tetraoxypropylene, tetraoxybutylene and the like. When the lower alkylene R has hydroxyl, the hydroxyl can exist at any positions of the alkylene, and an example of the alkylene having hydroxyl is (2-hydroxy)propylene.

The organic groups  $X_1$  and  $X_2$  can be alkyl having one to five carbon atoms such as methyl, ethyl or propyl.

The fluorene-based compound [I] is exemplified hereinafter.

Examples of fluorene-based (meth)acrylate are 9,

9-bis(4-(meth)acryloyloxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxymethoxyphenyl)fluorene, 9,

9-bis(4-(2-(meth)acryloyloxyethoxy)phenyl)fluorene, 9,

9-bis(4-(2-(meth)acryloyloxypropoxy)phenyl)fluorene, 9,

9-bis(4-(3-(meth)acryloyloxypropoxy)phenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxydimethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxydiethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxydipropoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytrimethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytriethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytripropoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytetramethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytetraethoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxytetrapropoxyphenyl)fluorene, 9,

9-bis(4-(meth)acryloyloxy-3-methylphenyl)fluorene, 9,